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ABSTRACT

To investigate the effects of wording in attitude test items, a five-point Likert-type rating scale was administered to 173 undergraduate education majors. The test measured attitudes toward college and self, and contained 38 positively-worded items. Thirty-eight negatively-worded items were also written to parallel the positive statements. Correlations between scores on the parallel items were significant for 27 of the 38 item pairs, and ranged from .43 to .01, with a median correlation of .22. The reliabilities of total and subscale scores were above .80, with higher reliabilities noted for the negatively oriented scales. Factor analysis of the 76 items yielded an eight-factor solution; eight of the items did not load significantly on any factor and seven items loaded on two factors. The positive and negative items loaded positively on different factors on four out of eight factors, indicating that the item format influenced student responses. There was little evidence of bipolarity. Negative loadings were present, but for the most part, small. It was concluded that scoring negatively-oriented attitude test items by reversing the scoring procedures used for positive items may not yield a valid measure of the attitudes tested. (GDC)

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Influence of Item Direction on Student Responses in Attitude Assessment

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Influence of Item Direction on Student Responses

in Attitude Assessment

In recent years educators have given a lot of attention to developing and using instruments designed to tap the affective domain. Attitudes have received perhaps more attention than any other theoretical construct in this domain. But in spite of the great interest in attitudes and their measurement, many of the item writing and scoring rules reported in educational measurement texts have not been investigated empirically. Researchers who have given direction to the development of instruments designed to measure attitudes include Thurstone (1931), Likert (1932), Guttman (1950), and Kerlinger (1972).

Studies conducted by Simpson (1970) and Simpson, Rentz, and Shrum (1972, 1976), have raised questions about the influence of item characteristics on student responses. These researchers found that respondents were more influenced by an "agree-disagree" set in some topical areas in science than by the intended meaning of the attitudinal items. Their findings also indicate that responses were more influenced by the item directionality (positive versus negative) than the intensity of the wording of the items.

Hatcher (1978) has recently completed a study that raises further questions regarding the relationship between item directionality and student responses to self-report instruments. Her study indicates the presence of two separate dimensions of self-concept, positive self-concept and negative self-concept, in an attitudinal scale instead of the expected unidimensional bipolar continuum.

Many measurement text authors (Thorndike and Hagen, 1969; Stanley and Hopkins, 1972; Tuckman, 1972; and Ahman and Glock, 1975) recommend the scoring of negative items by simply reversing the scoring procedure used for positive items. The investigators in this study believe this logically derived approach to scoring attitudinal items may not be advisable. The purpose of this study is to investigate the effect of the directionality, positive versus negative, of an attitudinal item on the response.

Method

Development of the Instrument

The researchers constructed an instrument consisting of 76 items. Thirty-eight of the items have a positive orientation regarding a student's feelings toward himself or college. The remaining 38 items parallel the positively oriented situations but are written so as to have negative orientations. These items were validated by a three member panel who matched each positive item with its parallel opposite. Any item which could not be matched with its opposite was rewritten incorporating the suggestions of the panel to produce a pair of parallel items.

An example of one pair of parallel items from the instrument follows:

I enjoy going to class.

Attending class is a real drag.

The 76 items were assigned positions in the instrument using a table of random numbers. Directions prepared for the instrument requested the respondent to indicate on a five point Likert scale -- "strongly agree," "agree," "no opinion," "disagree," and "strongly disagree" -- how closely each item described him/her.

Procedure

One hundred seventy-three junior and senior level college students en-

rolled in professional education classes at Oklahoma State University in the fall semester of 1977 completed the instruments during a class period within a two week time span. The class instructors distributed and collected the completed instruments. The subjects were not told the purpose of the research but were told the researchers were interested in determining how college students feel about themselves and college. It was emphasized that completing the instrument was not required and was strictly voluntary. The design of the instrument insured anonymity to the subjects. The students were not asked to record their name or I.D. numbers.

The 38 items having negative orientations were scored by reversing the procedure used in scoring the positive items. Response totals were calculated for the complete instrument, the two subscales comprised of the positively oriented items and the parallel negatively oriented items, and the four subscales dealing with attitudes toward college, positively and negatively oriented items, and attitudes toward self, positively and negatively oriented items.

Means, standard deviations, and reliability coefficients (alpha) of the responses to the total instrument and the six subscales were also calculated. The correlations among all scale items were calculated and the resulting 76 by 76 correlation matrix was factor analyzed using the SPSS subprogram FACTOR (Nie et al.). A principal-component solution with iteration was employed. The factors were rotated orthogonally with the varimax method (Kaiser, 1958).

Results

Correlations between the scores on the 38 pairs of parallel items were calculated. Significant correlations (.05 level) between scores on twenty-seven pairs of the parallel items were identified. The correlations

ranged from .43 to .01 with a median correlation of .22.

Means, standard deviations, and reliability coefficients (alpha) for the total scale scores and the subscale scores were calculated and are reported in Table 1. The differences between the mean scores on the positive subscales and the parallel negative subscales were analyzed using the correlated t-test. The three t values are significant at the .001 level as indicated in Table 1.

Table 1

Reliability Estimates, Means, Standard Deviations and t Values for the Total Instrument and Six Subscale Scores

Scale	r_{tt}	$\bar{x}$	s	t
COLLEGE-POSITIVE[a]	.76	65.21	7.78	32.10*
COLLEGE-NEGATIVE[a]	.86	81.11	5.17	
SELF-POSITIVE[a]	.84	68.10	9.63	17.80*
SELF-NEGATIVE[a]	.86	79.03	4.49	
POSITIVE[b]	.87	133.31	15.55	23.13*
NEGATIVE[b]	.90	160.14	8.88	
TOTAL[c]	.92	293.45	21.99	

*p < .001 N = 173

[a]Number of items = 19

[b]Number of items = 38

[c]Number of items = 76

The reliabilities (alpha) of the total scale scores and the subscale scores appear satisfactory. The reliability estimates except for the college-positive orientation scale are all above .80. It is interesting to note that the negatively oriented scales are slightly more reliable than the positive orientation scales.

A factor analysis of the 76 items was carried out using an eight-factor matrix. An eight-factor solution was selected because of the magnitude of the eigenvalues and a comparison of the solutions of various numbers of rotated factors showed the eight-factor solution yielded the most satisfactory structure. A summary of the loadings is presented in Table 2 on the following page. Loadings of .35 or greater were accepted as significant. Eight of the items did not load significantly on any of the eight factors and seven of the items loaded significantly on two factors. The unrotated and rotated factor matrices are included in Appendix A.

Note that the positive and negative items tend to load positively on different factors on four out of eight of the factors. This indicates that the positive versus negative item structure influenced the student responses. There is little evidence of bipolarity. Negative loadings are present in the matrix but they are for the most part small.

Discussion

The results of this study suggests that the widely accepted practice of scoring negatively oriented attitudinal items by reversing the scoring procedures used for positive items may not yield a valid measure of the subjects expressed attitudes. Significant differences were found between each pair of positive-negative subscales indicating students do not respond to negatively and positively oriented items with the same intensity.

Table 2

Numbers of the Four Item Types Loading[a] on the Eight Factors

Sample N = 173

	Factor I				Factor II				Factor III				Factor IV				Factor V				Factor VI				Factor VII				Factor VIII			
Loadings	PC[b]	PS[c]	NC[d]	NS[e]	PC	PS	NC	NS	PC	PS	NC	NS	PC	PS	NC	NS	PC	PS	NC	NS	PC	PS	NC	NS	PC	PS	NC	NS	PC	PS	NC	NS
.35-.44	0	7	0	1	5	1	0	0	3	1	3	2	2	0	1	0	0	1	0	5	0	0	0	0	0	0	5	3	0	1*	0	0
.45-.54	0	4	0	0	5	0	1	0	1	0	0	0	0	0	1	1	1	0	0	3	2	0	0	0	0	0	4	0	0	0	1	0
.55-.64	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	1	0
Totals	14		1		13		1		5		5		2		3		2		9		2		0		0		15		1		2	

[a]Loadings $\geq$ .35 were considered significant

[b]Positively oriented items - attitudes toward college

[c]positively oriented items - attitudes toward self

[d]Negatively oriented items - attitudes toward college

[e]Negatively oriented items - attitudes toward self

*Negative loading

Data analysis demonstrated that students' responses to negative items were more consistent, i.e. less variability, than their responses to the parallel positive items. This is especially noteworthy in view of the slightly higher reliabilities of the negatively oriented scales, since decreased variability is usually associated with decreased reliability. Also, negatively oriented items tended to elicit stronger responses than did the parallel positively oriented items. This indicates that students' responses may be more influenced by the directionality of the item than the content of the item.

Attitude assessment has become an area of increased interest at all levels and in all areas of education. Some educational areas have designated affective behaviors as a focus of top research priority. In many cases assessment procedures in this area have relied heavily on measurement techniques advocated for years by experts without verifying the reliability and validity of the scores produced by these techniques. In this study, the directionality of the item appears to have unduly influenced responses. These results need to be researched further using subjects from all educational levels that use attitude assessment. However, it would seem that, while awaiting further research, educators and psychologists would be well advised to exercise caution in the use of agree-disagree instruments, especially in pre-, post-test situations. If pre- and post-tests contain different numbers of positively and negatively stated items pre-post differences could occur simply on the basis of item characteristics.

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APPENDIX A

Unrotated Factor Matrix

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	0.35	0.27	-0.01	-0.17	0.31	0.13	0.12	0.07
2	-0.27	0.03	0.05	0.34	0.01	0.03	0.12	0.06
3	0.43	-0.15	-0.10	-0.25	0.01	0.01	0.04	-0.05
4	0.31	0.06	-0.01	0.05	-0.05	-0.19	0.00	-0.19
5	0.42	-0.05	0.20	0.02	0.34	-0.11	-0.23	0.18
6	0.31	-0.06	0.03	-0.02	0.15	-0.05	-0.30	-0.15
7	0.10	0.02	-0.24	0.29	-0.14	-0.12	0.27	-0.21
8	0.25	0.10	-0.02	0.04	-0.27	0.25	-0.15	0.16
9	0.17	-0.13	0.22	0.07	0.21	0.13	0.17	0.08
10	0.34	0.09	-0.28	0.05	0.13	0.27	-0.03	0.07
11	0.17	-0.17	-0.26	0.19	-0.37	0.04	0.04	-0.04
12	0.46	0.01	-0.25	-0.29	0.07	0.18	-0.07	0.13
13	0.17	-0.20	0.05	0.11	-0.02	0.36	0.07	0.02
14	0.09	-0.23	0.14	0.20	-0.06	0.27	0.13	0.09
15	0.41	-0.09	-0.04	0.24	-0.06	0.14	-0.31	0.09
16	0.43	-0.12	-0.12	0.05	0.17	-0.10	-0.07	0.03
17	0.41	-0.01	0.24	0.09	-0.04	0.16	0.01	0.08
18	0.18	0.31	0.18	-0.01	0.08	0.07	-0.16	-0.03
19	0.40	-0.06	-0.19	-0.44	0.15	0.19	-0.05	-0.02
20	0.58	-0.04	0.29	-0.13	-0.23	-0.02	0.03	0.05
21	0.55	-0.07	0.23	0.03	-0.03	0.05	0.29	0.12
22	0.54	0.09	0.37	-0.07	-0.02	0.10	0.01	0.01
23	0.51	0.04	-0.21	0.06	-0.11	0.14	-0.35	0.04
24	0.46	-0.09	0.16	0.06	-0.40	-0.08	-0.11	0.03
25	0.38	0.06	0.04	-0.01	0.13	0.31	0.07	0.02
26	0.38	0.28	-0.10	-0.04	0.10	0.18	-0.02	-0.29
27	0.23	-0.13	0.06	-0.03	-0.26	0.03	0.04	-0.01
28	0.38	0.30	0.03	0.26	0.08	0.16	-0.05	-0.16
29	0.53	0.32	0.19	-0.01	-0.11	0.08	0.04	0.02
30	0.47	-0.09	-0.19	0.07	0.08	0.27	-0.05	-0.20
31	0.56	-0.16	-0.10	0.21	-0.27	-0.09	-0.29	0.15
32	0.46	0.09	-0.28	0.00	-0.11	0.24	0.08	0.15
33	0.58	-0.13	-0.19	0.00	0.11	0.01	0.14	0.14
34	0.60	0.31	0.09	-0.03	-0.13	0.07	-0.04	0.01
35	0.43	0.07	-0.38	0.17	-0.15	-0.21	0.20	-0.11
36	0.49	-0.05	0.15	0.06	-0.05	-0.02	0.15	0.03
37	-0.08	0.08	0.11	0.14	0.20	-0.04	-0.25	0.06
38	0.18	-0.14	0.07	0.19	-0.23	0.08	0.13	0.18
39	0.54	0.21	0.15	-0.22	-0.30	-0.05	0.13	-0.11
40	0.40	-0.01	0.32	-0.08	0.14	-0.03	0.10	0.00
41	0.50	0.01	0.28	-0.14	-0.14	0.06	-0.05	-0.08

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
42	0.52	-0.21	0.08	-0.25	-0.03	-0.26	0.00	0.00
43	0.36	-0.20	0.14	-0.24	-0.06	-0.15	0.06	0.28
44	0.60	-0.29	-0.12	0.18	-0.00	-0.19	-0.17	0.15
45	0.40	-0.18	-0.03	0.17	0.14	-0.08	0.04	0.13
46	0.35	-0.12	0.21	0.09	0.03	-0.17	-0.18	-0.13
47	0.45	-0.40	0.04	0.02	0.17	0.09	-0.17	-0.07
48	0.39	-0.45	0.01	-0.16	0.07	-0.13	0.23	0.32
49	0.52	0.34	0.05	-0.18	-0.22	-0.05	-0.07	-0.04
50	0.37	-0.24	0.30	0.03	-0.04	-0.05	0.04	0.16
51	0.23	0.38	0.03	0.24	0.05	-0.19	-0.01	-0.04
52	0.43	0.40	0.18	0.14	0.05	-0.15	-0.00	0.11
53	0.51	0.44	0.02	0.02	-0.10	-0.12	0.19	-0.03
54	0.32	0.51	0.12	0.00	0.09	-0.21	-0.08	0.12
55	0.45	0.28	-0.08	-0.28	-0.03	0.02	-0.01	-0.07
56	0.47	0.07	-0.33	0.21	0.10	0.00	0.02	0.13
57	0.28	0.22	0.29	0.11	0.13	-0.06	0.03	0.14
58	0.51	-0.30	-0.07	-0.18	-0.01	-0.09	-0.07	-0.24
59	-0.00	0.31	0.23	0.17	0.06	-0.09	-0.12	0.20
60	0.41	0.28	-0.11	0.00	0.03	-0.03	0.03	-0.01
61	0.47	-0.11	0.37	0.30	-0.01	0.11	0.00	-0.19
62	0.48	0.10	-0.34	0.03	-0.01	0.10	-0.07	0.20
63	0.37	-0.28	0.03	-0.08	-0.18	0.05	-0.06	-0.08
64	0.51	-0.18	-0.14	0.17	0.11	-0.19	0.02	-0.01
65	0.50	-0.19	0.20	0.16	0.16	0.08	0.28	-0.25
66	0.52	0.21	-0.09	-0.01	-0.11	-0.14	-0.09	-0.08
67	0.46	0.08	-0.39	0.14	0.13	0.04	0.16	0.10
68	0.48	-0.23	0.18	-0.04	0.02	0.15	0.11	-0.25
69	0.42	0.15	-0.46	0.04	0.01	-0.12	0.12	0.03
70	0.53	0.00	-0.34	-0.19	0.04	0.05	0.07	0.12
71	0.49	0.20	-0.16	-0.21	-0.01	0.05	0.07	0.12
72	0.58	-0.09	0.32	-0.11	0.12	-0.12	-0.04	-0.08
73	0.60	-0.34	-0.19	0.02	0.13	-0.20	0.01	-0.06
74	0.30	0.19	0.02	0.08	0.20	-0.06	0.20	0.04
75	0.59	-0.22	-0.12	0.12	0.14	-0.15	-0.01	-0.17
76	0.62	0.04	0.06	0.14	0.12	0.05	-0.10	-0.17

Rotated Factor Matrix

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
1	0.32	0.35	0.18	-0.23	0.17	-0.13	-0.00	-0.01
2	-0.04	-0.10	0.40	-0.03	0.06	0.09	-0.15	-0.03
3	0.01	0.23	0.40	0.03	0.13	0.05	0.23	0.10
4	0.22	0.02	0.13	0.04	0.00	0.21	0.25	-0.05
5	0.26	0.14	0.00	-0.04	0.15	-0.32	0.45	0.15
6	0.10	0.07	0.14	0.03	0.01	-0.14	0.40	-0.14
7	0.02	0.10	-0.11	0.01	0.01	0.52	0.05	-0.07
8	0.19	0.20	0.07	0.42	0.08	-0.09	-0.08	-0.05
9	0.04	0.04	-0.04	-0.11	0.40	-0.09	0.07	0.10
10	0.06	0.51	0.05	0.05	0.11	-0.03	0.06	-0.13
11	-0.15	0.15	0.01	0.37	0.01	0.34	0.07	-0.01
12	0.05	0.49	0.36	0.08	0.05	-0.13	0.11	0.05
13	-0.06	0.23	0.07	0.21	0.45	-0.01	0.10	-0.05
14	-0.13	0.03	-0.12	0.17	0.40	0.01	-0.02	0.04
15	0.08	0.25	-0.08	0.38	0.13	-0.11	0.32	-0.09
16	0.09	0.28	0.07	0.01	0.09	0.02	0.40	0.08
17	0.23	0.08	0.07	0.21	0.37	-0.07	0.13	0.03
18	0.36	0.02	0.05	0.02	0.04	-0.18	0.03	-0.17
19	-0.04	0.38	0.50	-0.07	0.08	-0.16	0.13	-0.00
20	0.33	0.00	0.36	0.31	0.31	0.02	0.21	0.19
21	0.27	0.15	0.16	0.11	0.49	0.11	0.14	0.25
22	0.40	0.03	0.27	0.15	0.39	-0.11	0.16	0.04
23	0.14	0.40	0.14	0.39	-0.02	-0.08	0.29	-0.15
24	0.21	-0.03	0.19	0.49	0.14	0.12	0.24	0.11
25	0.15	0.29	0.13	0.02	0.35	0.09	0.03	-0.09
26	0.27	0.27	0.24	-0.05	0.11	0.07	0.08	-0.35
27	0.01	-0.01	0.18	0.26	0.14	0.12	0.06	0.08
28	0.38	0.22	-0.05	0.08	0.20	0.06	0.13	-0.32
29	0.52	0.16	0.21	0.19	0.23	0.02	0.03	-0.03
30	-0.01	0.38	0.17	0.10	0.25	0.08	0.26	-0.26
31	0.13	0.25	0.03	0.54	0.03	0.01	0.44	0.11
32	0.12	0.52	0.15	0.23	0.14	0.10	-0.02	0.02
33	0.10	0.46	0.16	0.04	0.24	0.11	0.29	0.21
34	0.51	0.24	0.26	0.24	0.17	0.02	0.10	-0.06
35	0.18	0.34	0.07	0.10	-0.06	0.52	0.21	0.03
36	0.24	0.11	0.14	0.23	0.33	0.13	0.20	0.15
37	0.10	-0.06	-0.22	-0.05	-0.07	-0.25	0.12	-0.09
38	0.00	0.05	-0.09	0.29	0.24	0.13	-0.01	0.17
39	0.43	0.04	0.47	0.22	0.16	0.20	0.04	0.06
40	0.28	-0.01	0.19	-0.06	0.34	-0.07	0.21	0.12
41	0.29	-0.02	0.36	0.22	0.28	-0.05	0.20	0.00
42	0.13	0.05	0.40	0.07	0.10	0.05	0.41	0.29
43	0.09	0.06	0.26	0.12	0.14	-0.08	0.18	0.45

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8
44	0.07	0.30	0.02	0.28	0.10	0.07	0.58	0.22
45	0.08	0.23	-0.06	0.04	0.21	0.05	0.35	0.18
46	0.17	-0.10	0.08	0.11	0.13	-0.01	0.44	-0.01
47	-0.13	0.16	0.15	0.09	0.31	-0.11	0.51	-0.01
48	-0.13	0.19	0.19	0.01	0.28	0.03	0.26	0.57
49	0.50	0.16	0.38	0.23	-0.02	0.05	0.07	-0.03
50	0.11	-0.05	0.08	0.18	0.34	-0.05	0.26	0.28
51	0.48	0.08	-0.15	-0.02	-0.06	0.13	0.11	-0.09
52	0.62	0.13	-0.03	0.06	0.03	0.00	0.12	0.05
53	0.60	0.22	0.18	0.05	0.07	0.25	0.02	0.01
54	0.64	0.12	0.03	-0.06	-0.08	-0.04	0.03	0.06
55	0.35	0.27	0.42	0.03	-0.01	0.01	0.04	-0.06
56	0.17	0.53	-0.07	0.08	0.04	0.15	0.23	0.04
57	0.43	0.01	-0.07	-0.02	0.20	-0.11	0.09	0.10
58	-0.05	0.13	0.42	0.08	0.13	0.13	0.47	0.01
59	0.38	-0.07	-0.24	0.04	-0.04	-0.18	-0.04	0.03
60	0.36	0.30	0.13	0.02	0.02	0.10	0.09	-0.05
61	0.23	-0.08	-0.01	0.20	0.51	0.07	0.34	-0.14
62	0.15	0.57	0.09	0.20	-0.01	0.03	0.14	0.04
63	-0.07	0.04	0.28	0.27	0.19	0.07	0.26	0.05
64	0.10	0.28	0.02	0.04	0.13	0.20	0.48	0.13
65	0.13	0.06	0.12	-0.09	0.57	0.23	0.33	-0.05
66	0.39	0.22	0.23	0.17	-0.04	0.15	0.25	-0.04
67	0.14	0.59	-0.01	-0.01	0.09	0.22	0.06	0.04
68	0.04	0.04	0.31	0.05	0.46	0.10	0.29	-0.08
69	0.17	0.51	0.10	0.00	-0.12	0.31	0.15	0.05
70	0.12	0.43	0.36	0.02	-0.08	0.16	0.30	0.05
71	0.28	0.42	0.31	0.06	0.04	0.02	0.04	0.10
72	0.31	-0.01	0.30	0.01	0.32	-0.08	0.43	0.11
73	-0.01	0.31	0.20	0.02	0.15	0.19	0.59	0.17
74	0.32	0.20	-0.02	-0.17	0.17	0.09	0.08	0.07
75	0.09	0.26	0.15	0.02	0.19	0.21	0.57	0.01
76	0.31	0.23	0.13	0.10	0.28	0.04	0.42	-0.17